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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Carlsson

Serial No.: 09/887,630

Filing Date: June 22, 2001

Docket No.: 4015-955

Title: Wireless Network Architecture and Protocol for Location Services in GPRS Packet Data Network

Examiner: Mr. Justin M. Philpott

Group Art Unit: 2665

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APPEAL BRIEF

(1) Real Party in Interest

The real party in interest is Ericsson Inc., the Assignee of the present application.

(2) Related Appeals and Interferences

There are no related appeals or interferences to the best of Applicant's knowledge.

(3) Status of Claims

Twenty (20) claims have been finally rejected by the Examiner. They are claims 1-20. Applicant appeals from all rejected claims.

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(4) Status of Amendments

No claims have been amended.

(5) Summary of Invention

The Global System for Mobile Communications (GSM) is a global standard for wireless telecommunications. The GSM standard was developed primarily for voice communications, wherein a logical traffic channel is dedicated to a communications session, or call. Such a network is known in the art as "circuit-switched." GSM is also used to provide circuit-switched data communication services that require a continuous connection.

The General Packet Radio Service (GPRS) is a recent extension of the GSM standard to provide packet-switched data services to GSM mobile stations. In a packet-switched network, data is assembled into one or more addressable units ("packets") and broadcast onto the network. The packet is routed through the network according to its address, ultimately reaching the addressee network entity, such as a mobile station in a GPRS on a GSM network. Packet-switched data services are used for transmitting small amounts of data or for data transfers of an intermittent or bursty nature, such as Internet browsing, wireless e-mail, and the like.

The GSM standard is also capable of providing a variety of information services to subscribers. Location Services (LCS) is one example of an information service that GSM may provide. LCS allows a subscriber or client to obtain or determine the location of a GSM mobile station operating within the GSM network. The location may be determined in various ways; such as by the network, based on measurements supplied by the mobile station, or determined by the mobile station itself and communicated to the network.

In the current GSM standard, a specialized, centralized server, known as the Serving Mobile Location Center (SMLC), and referred to herein as a "location server," manages the overall coordination and scheduling of resources required to determine and track the position of a mobile station. In performing this function, the location server must communicate with various

network resources, such as for example a Location Measuring Unit (LMU), as well as the mobile station itself. Protocols for this communication are well established in the conventional, circuit-switched GSM network. However, communications protocols for the packet-switched GPRS network are still in development and have not been finalized.

According to the present invention, information related to location services may be communicated between a location server and a mobile station by routing the information in a non-intuitive manner, whereby it passes through a Base Station Subsystem (BSS) twice. In particular, location services information is first routed from a location server to the BSS. From there, the information goes to a GPRS serving node. In forwarding the information to the mobile station, the GPRS serving node sends it *back* through the BSS, where it is broadcast from a base station antenna to the mobile station. One reason for this circuitous message routing is that its implementation requires a minimum of modification to existing GSM networks that include GPRS functionality. In particular, as described in the Specification at p. 11, lines 1-7, only the BSS GPRS Protocol (BSSGP) need be modified at the interface between the BSS and the GPRS Serving Node.[1]

The location services information routing of the present invention is further explained with reference to Figure A below, which depicts only the relevant nodes of a GSM network 30, as depicted in Figure 1 of the Specification.[2] A straightforward implementation of routing information from a location server 38 to a mobile station 80 would be directly to the GPRS Serving Node 32, and from there through the BSS 60 for wireless transmission to the mobile station 80, as indicated by the dashed lines. According to the present invention, however, the location services information is first sent from the location server 38 to the BSS 60. It is then

[1] The required modification is the addition of a new BSSGP message, to carry Radio Resource LCS Protocol (RRLP) messages. This modification is well within the ability of one of skill in the art, once armed with the teachings of the present invention.
[2] Figure A additionally depicts a Home Location Register (HLR) 36 connected to the GPRS Serving Node 32. The HLR 36 is not part of Applicant's invention; rather, it is depicted, in the same configuration as in Figure 1 of the Specification, to distinguish the HLR 36 from the location server 38, as discussed herein.

forwarded from the BSS 60 to the GPRS Serving Node 32, which routes it *back* through the BSS 60. Only then does the BSS 60 wirelessly transmit the information to the mobile station 80, as indicated in Figure A by the solid lines.

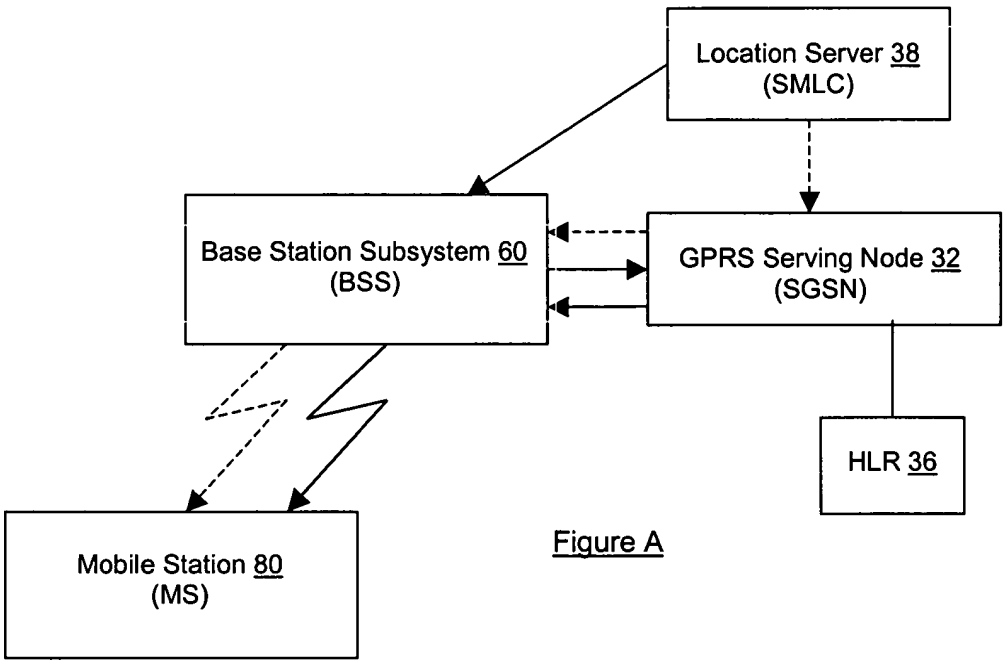

Figure A

According to other embodiments of the present invention, the mobile station 80 may route location services information to the location server 38 via the reverse path. In other embodiments, the location server 38 similarly routes location services information to a Location Measuring Unit (LMU), located either in the mobile station 80 or in the BSS 60.

(6) Issues

Whether claims 1-20 are obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 6,522,889 to Aarnio ("Aarnio"), in view of U.S. Patent No. 6,167,040 to Haeggstrom ("Haeggstrom")?

(7) Grouping of Claims

The claims should be grouped as follows:

Group I: claims 1-4, directed to a method of transmitting a location service message between a location server and a mobile station.

Group II: claims 5-8, directed to a method of transmitting a location service message between a mobile station and a location server.

Group III: claims 9-12, directed to a communications network.

Group IV: claims 13-16, directed to a method of transmitting a location service message between a location server and a LMU.

Group V: claims 17-20, directed to a method of transmitting a location service message between a LMU and a location server.

All of the claims in each group stand or fall together.

(8) Argument

The Examiner rejected claims 1-20 under 35 U.S.C. § 103 as being unpatentable over Aarnio in combination with Haeggstrom. Aarnio discloses a method of determining the precise location of a mobile station based on the view the mobile station has of its surroundings. A digital camera (possibly one integrated into the mobile station) captures an image of the mobile station's surroundings. A converter server such as an Optical Character Reader (OCR) converts the image to a text format. The text information is forwarded to a location server, which may be on the Internet. Based on an analysis of the converted text data and the mobile station's general location, the location server determines the precise location of the mobile station, and sends this information back to the mobile terminal. In one embodiment, the location server is not on the Internet but part of the wireless network, and it communicates directly with the GPRS network. See Figure 1. Aarnio discusses only the transmission of visual images encoded into a text format, and the determination of location information from the images. While the GPRS network of Aarnio likely includes a GPRS serving node and a BSS, Aarnio

does not disclose, teach or suggest any particular routing of location services information within the wireless network.

The Examiner combined Aarnio with Haeggstrom. Haeggstrom has nothing to do with location determination, or the communication of location services information between a location server and a mobile station. Haeggstrom discloses configurations of a GSM network having GPRS functionality for transmitting digitally encoded speech between a mobile station in the GSM network and an Internet-connected terminal equipment acting as a telephone. According to Haeggstrom's invention, the terminal equipment includes a voice coder/decoder (codec) of the same type and functionality as that in the mobile station. The mobile station and the terminal equipment then exchange digitally encoded voice information in data packets. That is, they utilize the packet-switched functionality of the GPRS system to directly exchange their respective digitally encoded speech. In doing so, they avoid the speech codecs that are an integral part of the circuit-switched GSM network; hence avoiding multiple encoding (known as tandem coding) that degrades speech quality. Haeggstrom is completely silent as to any location determination, or the routing of any location services information within the network.

The Examiner has failed to establish a *prima facie* case of obviousness in combining Aarnio and Haeggstrom. First, the Examiner has failed to establish a teaching or motivation that would lead one of ordinary skill in the art to combine the two references. Furthermore, the proposed combination fails to teach each and every claimed limitation.

No Motivation to Combine

A teaching or suggestion to make the asserted combination and a reasonable expectation of success in doing so must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991), MPEP § 2143.

> To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge

> of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

In rejecting claim 1, the Examiner stated that it would have been obvious to modify the system of Aarnio that extracts location from text-encoded image data, with the network configuration of Haeggstrom "in order to provide improved connection of calls between a telephone in a data network and a mobile station without using any public switched telephone network, thus achieving improved speech quality." Final Office Action of 3/10/2004, p. 8-9. Aarnio is completely silent regarding the connection of calls between a telephone in a data network and a mobile station. Aarnio does not mention any public switched telephone network, or suggest why one may wish to avoid routing calls through it. Aarnio does not disclose or suggest any deficiency regarding speech quality, as Aarnio does not disclose or discuss any speech call at all. The sole teaching of Aarnio is the transmission of text-encoded image data from a mobile station to a location server, the determination of the mobile station's location from the image data, and the transmission of this location information back to the mobile station. Nothing in Aarnio suggests any deficiency in the quality of any voice communications in Aarnio's network. Nothing in Aarnio, or in the art generally, would lead one of ordinary skill to combine the teaching of Aarnio (location determination through analysis of text-encoded images) to the system of routing of *voice* packets between a mobile station and an Internet telephone, as disclosed in Haeggstrom. Nor is such motivation found in Haeggstrom. At the very least, the Examiner has articulated no credible suggestion or motivation for the combination – improving speech quality by avoiding a PSTN, as proffered by the Examiner, is utterly and completely inapposite to the teaching of Aarnio.

In response to Applicant's arguments, the Examiner offered a separate motivation for making the combination. Noting (as Applicant pointed out) that Aarnio discloses only a GSM network with GPRS functionality – without disclosing the specific configuration of network

elements or their connectivity – the Examiner stated that "one of ordinary skill in the art could clearly be motivated to determine a particular arrangement for the devices within GPRS network 14, since Aarnio does not provide any insight as to such an arrangement, *in order to perform the system of Aarnio*." *Id.*, page 5, first full paragraph (emphasis added). Aarnio issued from the U.S. Patent and Trademark Office as U.S. Patent No. 6,522,889 on February 18, 2003. The disclosure of Aarnio thus necessarily, and as a matter of law,

> contain[s] a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.

35 U.S.C. § 112, first paragraph. Why, then, would one of ordinary skill in the art need to combine Aarnio with another reference, "to determine a particular arrangement for [network elements] in order to perform the system of Aarnio," when Aarnio itself provides an enabling disclosure?

Furthermore, when one of ordinary skill in the art encounters a prior art reference that identifies some industry standard system or procedure only as such, and that does not provide details of its inner structure or workings, the skilled artesian simply references the relevant standard. In the case of Aarnio, the structure and operation of GPRS functionality in a GSM network are fully detailed in "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS); Service description; Stage 2 (Release 1999)" (incorporated by reference into Applicant's Specification). To *understand* the undisclosed inner structure or function of a prior art reference, one of skill in the art does not *modify* that reference by combining it with another prior art reference directed to a completely unrelated application.

Unless, that is, one is a Patent Examiner attempting to construct a combination of prior art references, using an applicant's claims as a guide. That is improper obviousness analysis, as a matter of law. "One cannot use hindsight reconstruction to pick and choose among

isolated disclosures in the prior art to deprecate the claimed invention." *In re Fine*, 837 F.2d 1071,1075 (Fed. Cir. 1988). In this case, Aarnio discloses GPRS network as a "black box," and the Examiner selected Haeggstrom for the sole purpose of filling that box with details matching Applicant's claims. "One does not start with Claim 1 and go to the prior art to see if one can piece together the [claimed invention] from the combination of older things." *Medtronic, Inc. v. Daig Corp.*, 221 USPQ 593, 606 (D. Minn. 1983).

All claims stand rejected under 35 U.S.C. § 103 on the combination of Aarnio and Haeggstrom. As the Examiner has failed to articulate a suggestion or motivation to combine the references, relying, rather, on hindsight reconstruction using Applicant's claims, the Examiner has failed to establish a *prima facie* case of obviousness, and the § 103 rejections must be withdrawn.

Combination Does Not Teach a Location Server in the Wireless Network

Even assuming *arguendo* that the proposed combination is proper, it fails to teach or suggest all claimed limitations. Every independent claim recites a *location server*. This term is explicitly defined in Applicant's Specification: "The [Serving Mobile Location Center] SMLC 38 contains functionality required to support [Location Services] LCS. The SMLC 38 manages the overall coordination and scheduling of resources required to perform positioning of a mobile station 80 and is therefore sometimes *referred to as the location server*." p. 6, lines 3-6 (emphasis added). It is beyond question that patent applicants may be their own lexicographers. "As we have often stated, a patentee is free to be his own lexicographer." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). "A fundamental principle contained in 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers." MPEP § 2173.01.

Applicant has clearly, explicitly and unambiguously equated the term *location server* with a unit that "manages the overall coordination and scheduling of resources required to *perform* positioning of a mobile station," p. 6, lines 4-5 (emphasis added), and in particular, has equated

the term *location server* with the SMLC 38. Stated another way, the location server "contains functionality required to support [Location Services] LCS." *Id.*, at 3. These location services, or LCS, are also clearly defined in Applicant's Specification, at p. 7, line 18 – p. 8, line 3:

> [L]ocation service messages flow between the mobile station 80 and the SMLC 38 [that is, the location server]. These location service messages may aid the mobile station 80 in determining it position, aid the mobile terminal in taking position related measurements, and/or aid the SMLC 38 [*i.e.*, the location server] in estimating the position of the mobile station 80, depending on the location measurement approach taken. For instance, the location service messages may comprise so-called assistance data, such as GPS almanac data, GPS ephemeris data, or the like, provided by the SMLC 38 [*i.e.*, the location server] to the mobile station 80. Alternatively, the location service messages may be timed signal measurements, or the like, provided by the mobile station 80 to the SMLC 38 [*i.e.*, the location server].

According to Applicant's explicit definition, then, a location server is a network entity (such as the SMLC 38) that actively determines the position of a mobile terminal, and/or provides the mobile terminal with information that assists it in either determining its own position or taking measurements from which its position may be calculated.

"[A] patentee can be his own lexicographer provided the patentee's definition, to the extent it differs from the conventional definition, is clearly set forth in the specification." *Beachcombers v. WildeWood Creative Products, Inc.*, 31 F.3d 1154, 1158 (Fed. Cir. 1994). There is nothing ambiguous about Applicant's definition of the term *location server*, or of its functionality. The definition is explicit, and readily understood by those of skill in the art. "Patent law allows an inventor to be his own lexicographer. The specification aids in ascertaining the scope and meaning of the language employed in the claims inasmuch as words must be used in the same way in both the claims and the specification." *ZMI Corp. v. Cardiac Resuscitator Corp.*, 844 F.2d 1576, 1580 (Fed. Cir. 1988) (internal quotations omitted). There is absolutely no difference in the way Applicant uses the term *location server* in the claims and in the specification. In both instances, it refers to a network entity that actively performs or assists the

mobile terminal in performing location services, *e.g.*, ascertaining the geographic location of the mobile terminal.

Applicant appreciates that "limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1185 (Fed. Cir. 1993). Construing a patent claim term according to the applicant's explicit definition does not read any limitation from the specification into the claim. The disputed term exists in the claim, and it must be examined with the definition that the applicant ascribed to it. The Examiner's contention, at p. 2, third paragraph of the Final Office Action, that the entire definition must be recited in the claims to be given weight in patentability, would render moot the entire body of Federal Circuit precedent that a patentee may be his own lexicographer by clearly defining claim terms in the specification.

With this understanding of Applicant's definition of *location server*, it is clear that the Examiner's equating of that term with the Home or Visitor Location Register (HLR/VLR) of Haeggstrom is untenable. A HLR is a notoriously well-known element of wireless networks. The HLR is a directory that stores subscriber information[3] such as identity, service profile and the like. Whenever a mobile station becomes active and registers with the network, the HLR is updated to include the location of the mobile station *within the network*, *i.e.*, the serving base station and, if applicable, which sector of the base station. This network location information corresponds at a very coarse level with the mobile station's geographic location – to the granularity of the cell, and possibly the sector. As well known in the art, this network location information is used *by the network* (*e.g.*, the Mobile Switching Center or MSC) to route calls and data to and from the mobile station. There is no direct communication of any location information between a mobile station and a HLR/VLR.

The Examiner's attempt to equate the HLR/VLR of Haeggstrom with the claimed *location server* fails by even a cursory reading of the definition of location server (which the Examiner must consider). As quoted above, Applicant defined the location server as a network element

[3] The VLR stores corresponding information for visiting, or "roaming" subscribers.

that "manages the overall coordination and scheduling of resources required to *perform* positioning of a mobile station." A HLR/VLR neither performs any positioning whatsoever, nor coordinates or schedules resources required to do so. The HLR/VLR is merely a database. The mobile station's general location (to the accuracy of a cell or sector) is written to the HLR/VLR when the mobile station registers with the network or is handed off from one cell to another. The same information is later read out of the HLR/VLR when the network needs to route a call or data to the mobile station's serving sector. Applicant additionally defined the *location server* as "contain[ing] functionality required to support [Location Services] LCS." The HLR/VLR does not support any location services, as defined in the Specification (see p. 7, line 18 – p. 8, line 3, also quoted above). As well known in the art, a HLR/VLR merely provides the MSC or other network control entity the minimum network location information necessary to route a call for a given mobile station to the correct base station transceiver.

Haeggstrom does not teach or suggest that its HLR or VLR performs any function included in Applicant's explicit definition of a location server. Haeggstrom does not teach a HLR/VLR that generates any location information, that coordinates any resources for the generation of location information, that assists a mobile station in generating location information or that transmits location information to a mobile station (as recited in claims 1, 5 and 9). The only mention in Haeggstrom of a HLR is at col. 5, lines 7-10: "The GPRS network can use services of the PLMN network's mobile services switching centre MSC and of the subscriber databases of the home location register HLR and of the visitor location register VLR." This passage is a rather general statement of a feature of GPRS well known to those of skill in the art – that it rides on a GSM network, and has access to GSM network resources, such as the subscriber identifier databases HLR and VLR.

The above quoted passage is one of only three mentions in Haeggstrom of a VLR. The second is this:

> Normally, speech sent by a mobile telephone is routed to the mobile services switching centre MSC/VLR, either coded into PCM speech in a TRAU unit or in the case of a tandem free operation also as speech parameters."

col. 5, lines 14-18. This passage merely applies "VLR" as the co-label of a network node (MSC/VLR) in describing the routing of speech through the network – it does not describe any function of the VLR, and in particular has nothing whatsoever to do with location services. The third is found at col. 6, lines 13-18:

> At the receiving end the Internet telephone decodes the speech bits and, correspondingly, in the other direction of transmission it sends encoded speech bits towards gateway 41, from which they travel to the mobile services switching centre MSC/VLR and further to the mobile station MS."

Here again, the VLR is mentioned only as a co-label of the MSC/VLR network node, in describing how data is routed through the network. No location services, or indeed, any location information at all, is disclosed or taught by Haeggstrom as being transmitted from the VLR to a mobile station by *any* route, much less by the routing recited in Applicant's claims. In fact, the Examiner had to turn to another reference to even support the idea that the HLR/VLR stores any location information at all (and in so doing, the Examiner confused network location with geographic location). Haeggstrom's HLR/VLR fails to teach or suggest the location server of Applicant's claims, as that term is defined in the Specification and recited in the claims.

Still further, Figure 1 of Applicant's Specification clearly depicts *both* a location server (the SMLC 38) *and* a HLR 36, as recreated, in pertinent part, in Figure A above. If the HLR 36 were a location server, Applicant would have identified it as such in the Specification. It is not. Only the SMLC 38 is defined as a location server. In other words, at the time of the invention, Applicant clearly contemplated both a HLR 36 and a SMLC 38 coexisting in the same network – yet Applicant defined only the SMLC 38 as a *location server*. The Examiner is not free to ignore the Specification. "Claims must be read in view of the specification, of which they are a part." *Markman*, at 979. "During examination proceedings, claims are given their broadest reasonable interpretation *consistent with the specification*." *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir.

2000) (emphasis added). Again, Applicant does not propose or suggest reading limitations from the Specification into the claims. Rather, the Specification must be consulted to ascertain "the subject matter *which the applicant regards as his invention.*" 35 U.S.C. § 112, second paragraph (emphasis added). It is manifest from the Specification that Applicant contemplated a location server, that that it was not a HLR or VLR.

Finally, Applicant's statements in the record regarding the meaning of disputed claim terms cannot be dismissed. "When the applicant states the meaning that the claim terms are intended to have, the claims are examined *with that meaning*, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art." *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) (emphasis added). "Thus the inquiry during examination is patentability of the invention as 'the applicant regards' it." *Id.*, at 322 (citing 35 U.S.C. § 112, second paragraph). Applicant has repeatedly stated in the prosecution history, and repeats here, that the claimed *location server* does not read on a wireless network HLR or VLR, as is clear from a fair, straightforward reading of the Specification. Applicant defined a location server as a network entity that generates or assists in the generation of location information, of which a HLR/VLR is incapable.

Because the HLR/VLR of Haeggstrom does not teach or suggest a location server within the wireless network, as the term is explicitly defined in the Specification and clearly explained in the record by Applicant, and as recited in the claims, the combination of Haeggstrom with Aarnio fails to teach or suggest every claimed limitation. Consequently, the Examiner has failed to establish a *prima facie* case of obviousness, and the § 103 rejections must be withdrawn.

However, assuming *arguendo* that the Examiner has provided a reason that one of ordinary skill in the art would be led to combine the Aarnio with Haeggstrom, and even assuming *arguendo* that the HLR/VLR of Haeggstrom meets Applicant's clear and explicit definition of a location server, the proposed combination *still* fails to meet each and every claimed limitation. The claims recite specific, explicit routing of messages through the network,

i.e., from one network entity to the next. For any prior art to render such a claim obvious, it must teach or suggest transmitting a message *along the recited network path.*

The Examiner, relying on the open-ended transition term *comprising*, stated that performing the method steps of, *e.g.*, claim 1, in the order recited, is not a limitation of the claim. Final Office action, p. 2, first paragraph. Applicant agrees that the claims do not include ordinal terms such as *first*, *second*, *then*, *next* and the like. However, the plain language of the claims logically enforces an execution order, as explained below with reference to each claim group.

Group I

Claim 1 recites (with method step numbering added for clarity):

> A method of transmitting a location service message between a location server and a mobile station in a packet data network, said method comprising:
>
> [a] transmitting said location service message from said location server to a base station subsystem;
>
> [b] forwarding said location service message from said base station subsystem to a serving GPRS support node; and
>
> [c] forwarding said location service message from said serving GPRS support node to said mobile station.

As a preliminary matter, it is clear that claim 1 contemplates only a *single* location service message, and further that every reference to "*said* location service message" refers to the same message. The preamble recites transmitting "*a* location service *message*" (both the article "a" and the noun "message" are singular). All subsequent recitations of the message are in the singular, and use antecedent referential article "said," with no indication whatsoever that there are multiple messages, which claim 1 would have to distinguish between in order to "particularly point[] out and distinctly claim[]" the invention. 35 U.S.C. § 112, second paragraph.

The preamble of claim 1 recites and provides antecedent basis for two claimed elements, and additionally recites structure essential to the claim (a packet data network). The preamble thus breathes life and meaning into the claim, and must be considered. The preamble

unambiguously recites, "transmitting a location service message *between a location server and a mobile station*." Thus, the preamble provides the endpoints of a message transmission – a location server and a mobile station. The first task in claim construction, then, is to determine the order of the recited transmission. While the term *between* admits of two possibilities – *from* the location server *to* the mobile station or visa versa – a logical analysis of the succeeding claim limitations compels the conclusion that claim 1 recites the former.

Step [a] recites transmitting a message *from* the location server to a BSS. Step [c] recites forwarding a message *to* the mobile station. Nowhere does claim 1 recite the location server receiving a message, or any network entity transmitting or forwarding a message to the location server. Similarly, claim 1 does not recite a message transmitted from the mobile station to any network entity; only from a serving GPRS support node to the mobile station. Thus, the direction of the transmission is necessarily *from* the location server *to* the mobile station.

With the direction of transmission established, it is clear that the only possible ordering of the method steps is the order in which they are recited in claim 1 – first [a], then [b] and finally [c]. We must logically begin at the origin. Step [a] recites transmitting a message *from* the location server. This step must be performed first, as the location server is the origin of the transmission. Otherwise, there is no message to be transferred between any subsequently recited network entities. The message is transmitted from the location server to a BSS. Hence, following the execution of step [a] (which *must* be performed first), the message is at the BSS.

Step [b] recites *forwarding* – not *transmitting* – the message *from* the BSS *to* a serving GPRS support node. This language (as well as that of [c]) is further evidence that step [a] must be performed first. The verb *forward* means, "to send on to a subsequent destination or address." www.dictionary.com. Those of skill in the art do not refer to sending a message from its origin as *forwarding* it – that term is used to imply a *further* or *subsequent* transmission of a message along a path or network route. However, regardless of the verb used, step [b] logically must be performed after [a] and prior to [c]. This is self-evident, considering the network

location of the message. Step [a] (which must be performed first) left the message at the BSS. It is logically impossible to next execute step [c], forwarding the message *from* the serving GPRS support node to the mobile station. There is no message at the serving GPRS support node; the message is at the BSS. Only step [b] can advance the message from the BSS, which it does – to a serving GPRS support node.

Only now can step [c] be executed, *forwarding* the message *from* the serving GPRS support node. Prior to executing step [b], there was no message at the serving GPRS support node to be forwarded. Additionally, step [c] logically must be performed last. Step [c] recites forwarding the message from the serving GPRS support node *to the mobile station*. As established above, the mobile station is the terminus of the message transmission. Claim 1 does not recite transmitting or forwarding a message *from* the mobile station to any network entity. The mobile station is the ultimate recipient of the message, and hence step [c] must logically be executed last.

Claim 1 thus inherently imposes a specific order of execution on its recited method steps: a message is first transmitted from a location server to a BSS. It is then forwarded from the BSS to a serving GPRS support node. Finally, the message is forwarded from the serving GPRS support node to the mobile station. No other ordering of the method steps is logically possible, as one of ordinary skill in the art would readily recognize.

The combination of Aarnio and Haeggstrom does not disclose this order of message transmission and forwarding – that is, it does not disclose the network routing of a message from a location server to a mobile station recited in claim 1. Aarnio discloses transmitting messages between a location server and a mobile station precisely in the dotted-line route of Figure A above – from the location server directly to/through the GPRS network, which then forwards them to a BSS for transmission to the mobile station. Aarnio, Figure 1. In one embodiment, Aarnio interposes the Internet between the GPRS and the location server. *Id.* However, this does not alter the message routing within the wireless network. Nowhere does

Aarnio teach or suggest sending location services messages from a location server to a BSS, from the BSS to a serving GPRS support node, and from the serving GPRS support node to the mobile station, as recited in claim 1.

Haeggstrom does not cure the failure of Aarnio to teach the method (and hence, the network message routing) of claim 1. Haeggstrom discloses routing speech data packets along the same path as Aarnio: from a mobile station through a base transceiver station and base station controller (*i.e.*, a BSS), to a serving GPRS support node (SGSN), and across the Internet to terminal equipment (TE). Haeggstrom, col. 5, lines 32-45, Figures 2, 3. Speech data packets travel in the reverse direction along the same route. col. 5, lines 60-67.

However, the TE of Haeggstrom is not, and the Examiner has not represented it to be, a *location server*. The Examiner conflates the HLR/VLR of Haeggstrom with a location server. However, even so, Haeggstrom discloses no routing of location services or information *from the HLR/VLR to/from a mobile station* at all. As discussed above, the three mentions in the disclosure of Haeggstrom of either HLR or VLR use the terms only to denominate network nodes, in describing the routing of *speech* (either in a circuit-switched network or in data packets in a packet-switched network).

The Examiner's *sole* basis for teaching the claimed network routing in Haeggstrom is Figure 2, which depicts a network diagram connecting the MSC/VLR to the BSC, and the BSC to the SGSN. Even if the VLR were a location server, this picture fails to teach that a location services message is transmitted from the VLR to a mobile station at all (which those of skill in the art know *not* to be the case in GSM networks), much less that the message is routed to the specific network entities, and in the order, recited in claim 1. At most, the network diagram of Figure 2 allows for the *possibility* that the method of claim 1 may be performed thereon (along with thousands of other message routings). The Examiner has failed to demonstrate that the method of claim 1 is *inherent* in the network configuration of Figure 2. "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may*

result from a given set of circumstances is not sufficient." *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981) (emphasis in original). Facts asserted to be inherent in the prior art must be shown by evidence from the prior art. *Elan Pharms. Inc. v. Mayo Foun. for Med. Educ. & Research*, 304 F.3d 1221 (Fed. Cir. 2002), *vacated on other grounds*, 346 F.3d 1051 (Fed. Cir. 2003). The Examiner has provided no disclosure, teaching or suggestion from Haeggstrom, or from the art generally, that the specific method steps of claim 1 are inherent in the network configuration of Figure 2. Accordingly, the combination of Aarnio and Haeggstrom fails to teach or suggest every recited and inherent limitation of claim 1. As all claims depending therefrom include all such limitations, all Group I claims are patentably non-obvious over the art of record.

Group II

Claim 5 is directly analogous to claim 1, but recites transmission of a location services message in a packet data network in the opposite direction – that is, from a mobile station to a location server. The analysis is analogous to that above with respect to claim 1. Claim 5 recites *transmitting* a location services message *from* the mobile station *to* the serving GPRS support node; *forwarding* the message *from* the serving GPRS support node *to* a BSS; and *forwarding* the message *from* the BSS *to* the location server.

As an inverse to claim 1, claim 5 necessarily requires the transmission to be from the mobile station to the location server. The method steps must necessarily be executed in the recited order. That is, claim 5 recites routing a location services message along a specific path through the network: from mobile station to serving GPRS support node to BSS to location server.

Neither Aarnio nor Haeggstrom, along or in combination, teach or suggest these method steps, performed in the recited order. Neither Aarnio nor Haeggstrom, along or in combination, teach or suggest routing a location services message among the network elements in the order recited by claim 5. In particular, neither reference teaches or suggests routing a location services message from the serving GPRS support node to the BSS prior to sending it to the

location server. Consequently, claim 5 and all Group II claims depending therefrom are patentably non-obvious over the art of record.

Group III

Claim 9 recites a communications network, including a location server providing location services to clients, and communicating with mobile terminals. Claim 9 further recites a BSS communicating with both the location server and the mobile terminal. Finally, claim 9 recites a support node providing packet data services to the mobile terminal. The support node is explicitly recited as *receiving* downlink location service messages from the BSS and *forwarding* them to the mobile terminal. That is, in a transmission of location services messages from the location server to the mobile terminal, the support node receives the messages from the BSS, and then forwards the messages to the mobile terminal (through the BSS). This unique routing of location services messages is simply not taught or suggested by either prior art reference, alone or in combination. Aarnio is simply silent as to the routing of messages within the wireless network (depicted in Figure 1 as simply the "GPRS network"). Haeggstrom does not teach any location server, and does not teach any routing of messages to or from the HLR/VLR that the Examiner erroneously posits as a location server. There is simply no suggestion whatsoever in Haeggstrom that location services messages travel from the BSC to the SGSN and then directly back to the BSC and on to the mobile terminal, as recited in claim 9.

Similarly, claim 9 recites the support node as *receiving* uplink location service messages from the mobile terminal (via the BSS) and *forwarding* the uplink location service messages to the BSS. This routing of location services messages from the mobile terminal to the support node, then to the BSS is not taught or suggested anywhere in the art of record.

The functional limitations of the support node receiving and transmitting messages from and to the BSS during the respective location services message transmissions are limitations of the claim and cannot be ignored. All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, (CCPA 1970),

MPEP § 2143.03. Even *if* the proposed combination of references were proper, and even *if* it taught all claimed elements, the combination simply fails to teach or suggest the communication functions of the support node as explicitly recited in claim 9. All the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974), MPEP § 2143.03. Consequently, claim 9 and all Group III claims depending therefrom are patentably non-obvious over the art of record.

Group IV

Claim 13 recites transmitting a location service message between a location server and a Location Measuring Unit (LMU). The LMU is discussed in the Specification at p. 7, lines 4-9 (emphasis added):

> The optional LMU 70 *makes radio measurements* to support one or more positioning methods, in fashions well known in the art. The LMU may be of a type A, wherein the LMU 70 is accessed over the normal GSM air interface. Alternatively, the LMU may be type B, wherein the LMU 66 is accessed over a special interface (known as Abis). While type B LMUs 66 may be stand-alone network elements, they may also be integrated into a BTS 64 as shown in Figure 1.

The routing of a location service message between the location server and the LMU in claim 13 is directly analogous to the routing of the location service message between the location server and the mobile station of claim 1. Accordingly, the same analysis applies. As discussed above with respect to claim 1, neither Aarnio nor Haeggstrom, along or in combination, teach or suggest routing a location services message among the network elements in the order recited by claim 13.

Moreover, neither Aarnio nor Haeggstrom teach or suggest a LMU at all. As defined, a LMU makes radio measurements to determine a mobile station's position. Aarnio assists a mobile station in determining its location by analyzing a textually encoded image of the mobile station's surroundings. Haeggstrom has nothing at all to do with determining location. Neither reference teaches or suggests – indeed, makes the slightest hint of – any network entity that determines the position of a mobile station by measuring radio waves.

In fact, Applicant is at a loss to find any specific statement by the examiner as to precisely how or where Aarnio or Haeggstrom (or the art generally) teaches or suggests a LMU, much less the specific method steps of routing a location service message between a location server and the LMU as recited in claim 13. In the Final Office Action, p. 7-8, the Examiner purported to reject claims 1, 5, 9, 13 and 17 in a single swoop, yet cites only "forwarding the location service message from the GPRS network (14) to the mobile station (*e.g.*, MS 12)."[4] With respect to all Group IV claims, the Examiner has at least failed to comply with 37 C.F.R. § 1.104(c)(2):

> In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, *the particular part relied on must be designated* as nearly as practicable. *The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.*

See also, MPEP § 706.

Regardless of the Examiner's support, *vel non*, for the rejection of Group IV claims, the combination of Aarnio and Haeggstrom clearly fails to teach or suggest the claimed method of transmitting a location services message between a location server and a LMU. Consequently, all Group IV claims are patentably non-obvious over the art of record.

Group V

Claim 17 recites transmitting a location service message between a LMU and a location server. The routing of the location service message from the LMU to the location server is directly analogous to the routing of the location service message between the mobile station and the location server as recited in claim 5. Accordingly, a similar analysis applies. As discussed above with respect to claim 5, neither Aarnio nor Haeggstrom, along or in combination, teach or suggest routing a location services message among the network

[4] Unless the examiner equates the LMU with a mobile station – an untenable proposition given Applicant's clear definition of the two as separate entities in the Specification (and additionally under the doctrine of claim differentiation).

elements in the order recited by claim 17. Additionally, as discussed above with respect to claim 13, neither Aarnio nor Haeggstrom, alone or in combination, teach or suggest a LMU at all. Consequently, all Group IV claims are patentably non-obvious over the art of record.

Conclusion

For the reasons discussed above, all rejected claims are patentably non-obvious over the art of record. Accordingly, the Board should overturn the Examiner, and direct the Examiner to withdraw all rejections and allow all pending claims.

Respectfully submitted,

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Dated: July 27, 2004

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(9) Appendix

Claims

1. A method of transmitting a location service message between a location server and a mobile station in a packet data network, said method comprising:

transmitting said location service message from said location server to a base station subsystem;

forwarding said location service message from said base station subsystem to a serving GPRS support node; and

forwarding said location service message from said serving GPRS support node to said mobile station.

2. The method of claim 1 wherein forwarding said location service message from said serving GPRS support node to said mobile station comprises encapsulating said location service message in a link control message and transmitting said link control message from said serving GPRS support node to said mobile station.

3. The method of claim 2 wherein transmitting said link control message from said serving GPRS support node to said mobile station comprises transmitting said link control message from said serving GPRS support node to said base station subsystem and relaying said link control message from said base station subsystem to said mobile station.

4. The method of claim 2 further comprising ciphering said link control message at said serving GPRS support node and deciphering said link control message at said mobile station.

5. A method of transmitting a location service message between a mobile station and a location server in a packet data network, said method comprising:

transmitting said location service message from said mobile station to said serving GPRS support node;

forwarding said location service message from said GPRS support node to a base station subsystem supporting said mobile station; and

forwarding said location service message from said base station subsystem to said location server.

6. The method of claim 5 wherein transmitting said location service message from said mobile station to said serving GPRS support node comprises transmitting said location service message from said mobile station to said base station subsystem and relaying said location service message from said base station subsystem to said serving GPRS support node.

7. The method of claim 5 wherein transmitting said location service message from said mobile station to said serving GPRS support node comprises encapsulating said location service message within a link control message and transmitting said link control message from said mobile station to said serving GPRS support node.

8. The method of claim 7 further comprising ciphering said link control message at said mobile station and deciphering said link control message at said serving GPRS support node.

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9. A communications network comprising:

a location server providing location services to clients related to the location of mobile terminals in said communication network, said location server communicating with said mobile terminals via location service messages;

a base station subsystem communicating with said location server and said mobile terminal, said base station subsystem receiving location service messages from said location server and said mobile station; and

a support node providing packet data services to said mobile station, said support node receiving downlink location service messages from said base station subsystem and forwarding said downlink location service messages to said mobile station, said support node further receiving uplink location service messages from said mobile station and forwarding said uplink location service messages to said base station subsystem.

10. The communication network of claim 9 wherein said support node transmits said downlink location service messages to said mobile station as part of a link control message.

11. The communication network of claim 10 wherein said support node transmits said downlink link control messages to said mobile station transparently through said base station subsystem.

12. The method of claim 11 wherein said support node and said mobile station support ciphering and deciphering of link control messages.

13. A method of transmitting a location service message between a location server and a LMU in a packet data network, said method comprising:

transmitting said location service message from said location server to a base station subsystem;

forwarding said location service message from said base station subsystem to a serving GPRS support node; and

forwarding said location service message from said serving GPRS support node to said LMU.

14. The method of claim 13 wherein forwarding said location service message from said serving GPRS support node to said LMU comprises encapsulating said location service message in a link control message and transmitting said link control message from said serving GPRS support node to said LMU.

15. The method of claim 14 wherein transmitting said link control message from said serving GPRS support node to said LMU comprises transmitting said link control message from said serving GPRS support node to said base station subsystem and relaying said link control message from said base station subsystem to said LMU.

16. The method of claim 14 further comprising ciphering said link control message at said serving GPRS support node and deciphering said link control message at said LMU.

17. A method of transmitting a location service message between a LMU and a location server in a packet data network, said method comprising:

transmitting said location service message from said LMU to said serving GPRS support node;

forwarding said location service message from said GPRS support node to a base station subsystem supporting said LMU; and

forwarding said location service message from said base station subsystem to said location server.

18. The method of claim 17 wherein transmitting said location service message from said LMU to said serving GPRS support node comprises transmitting said location service message from said LMU to said base station subsystem and relaying said location service message from said base station subsystem to said serving GPRS support node.

19. The method of claim 17 wherein transmitting said location service message from said LMU to said serving GPRS support node comprises encapsulating said location service message within a link control message and transmitting said link control message from said LMU to said serving GPRS support node.

20. The method of claim 19 further comprising ciphering said link control message at said LMU and deciphering said link control message at said serving GPRS support node.